

1 ABSTRACT OF THE DISCLOSURE

2 A deposition method includes, at a first temperature, contacting a
3 substrate with a surface activation agent and adsorbing a first layer over
4 the substrate. At a second temperature greater than the first
5 temperature, the first layer may be contacted with a first precursor,
6 chemisorbing a second layer at least one monolayer thick over the
7 substrate. The first layer may enhance a chemisorption rate of the first
8 precursor compared to the substrate without the surface activation agent
9 adsorbed thereon. One deposition apparatus includes a deposition
10 chamber with a precursor gas dispenser in a contacting zone and a
11 cooling gas dispenser in a cooling zone. A substrate chuck moves by
12 linear translational motion from the contacting zone to the cooling zone.
13 The substrate chuck includes a substrate lift that positions a deposition
14 substrate at an elevation above a heated surface of the substrate chuck
15 when dispensing a cooling gas or surface activation agent. Another
16 deposition apparatus includes a cooling chamber with a cooled substrate
17 chuck and a contacting chamber with a heated substrate chuck. The
18 contacting chamber also has a precursor gas dispenser and the heated
19 substrate chuck includes a substrate lift. A robotic substrate handler
20 moves a substrate from the cooled substrate chuck to the heated
21 substrate chuck.